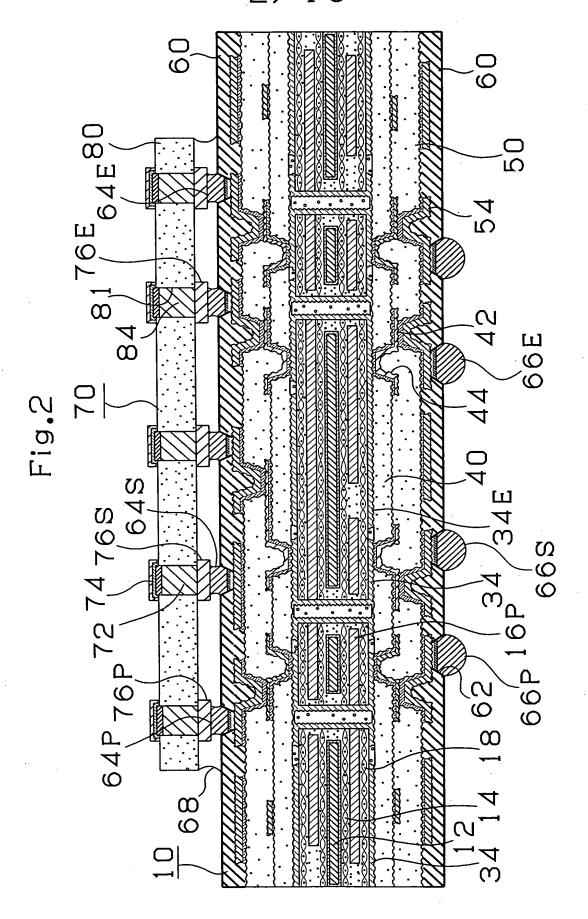


OBLON ET AL (703) 413-3000

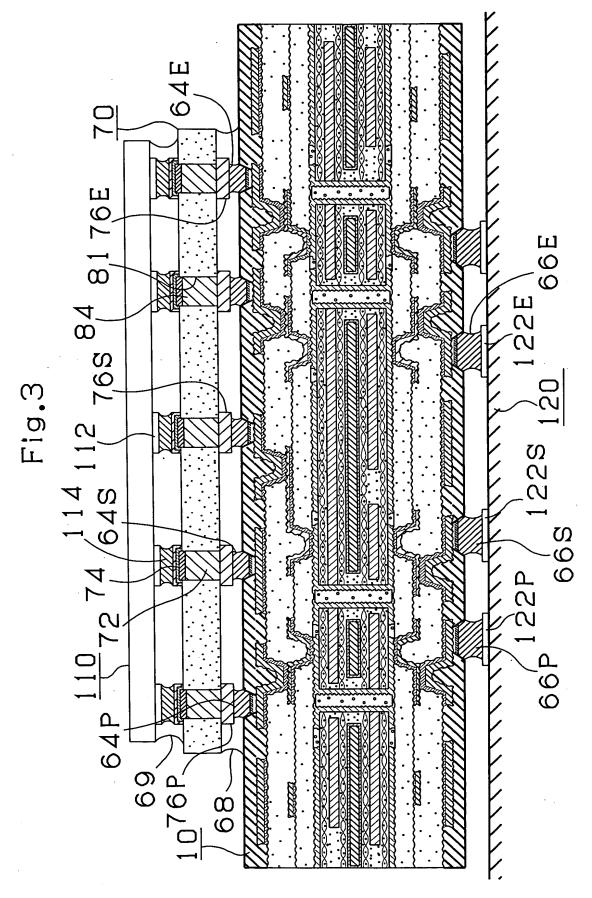
DOCKET # 28237/// S SHEET 2 OF 16

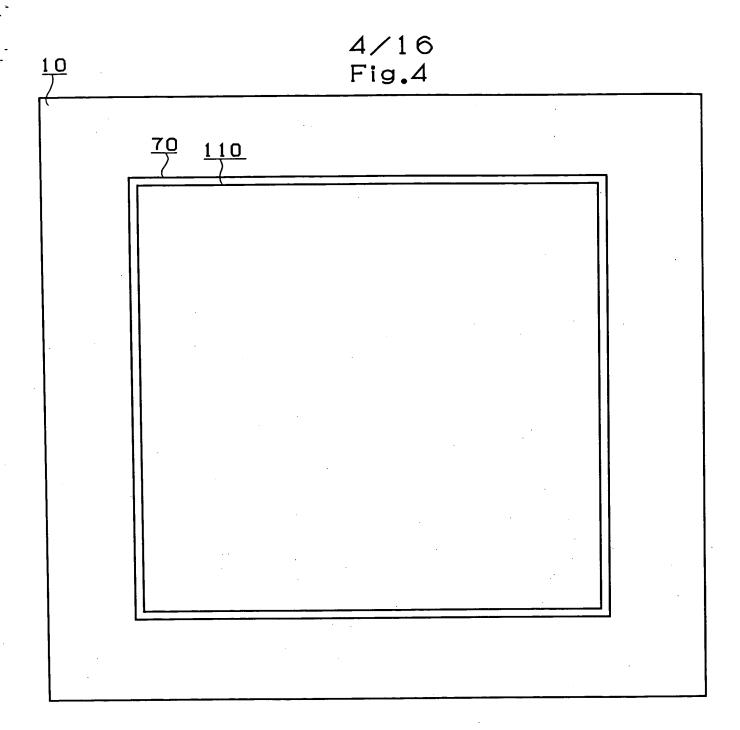
2 / 1 6

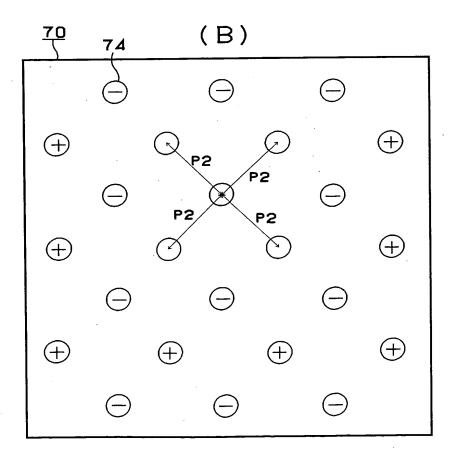


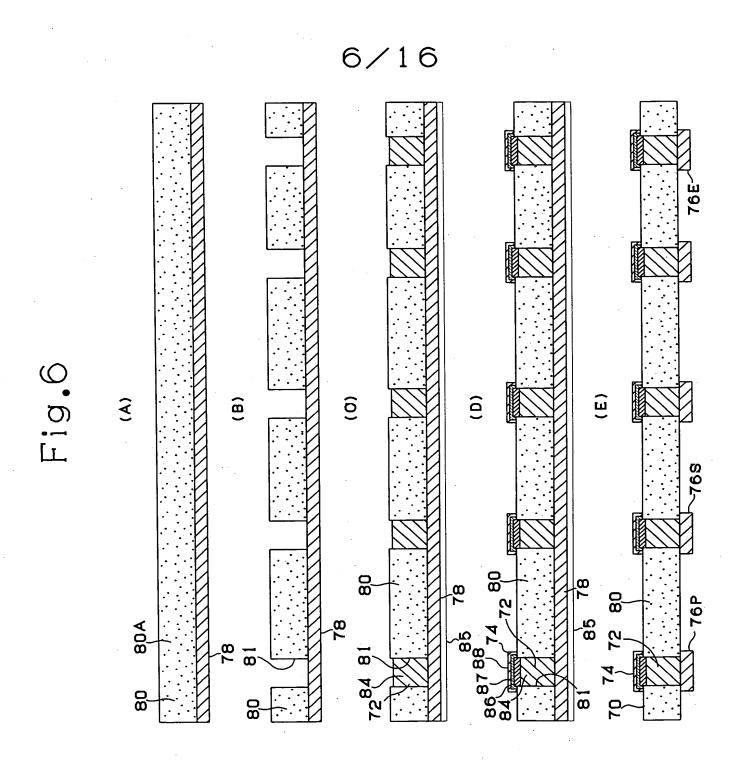
OBLON ET AL (703) 413-3000 DOCKET # 28237/US SHEET 3 OF 16

3/16

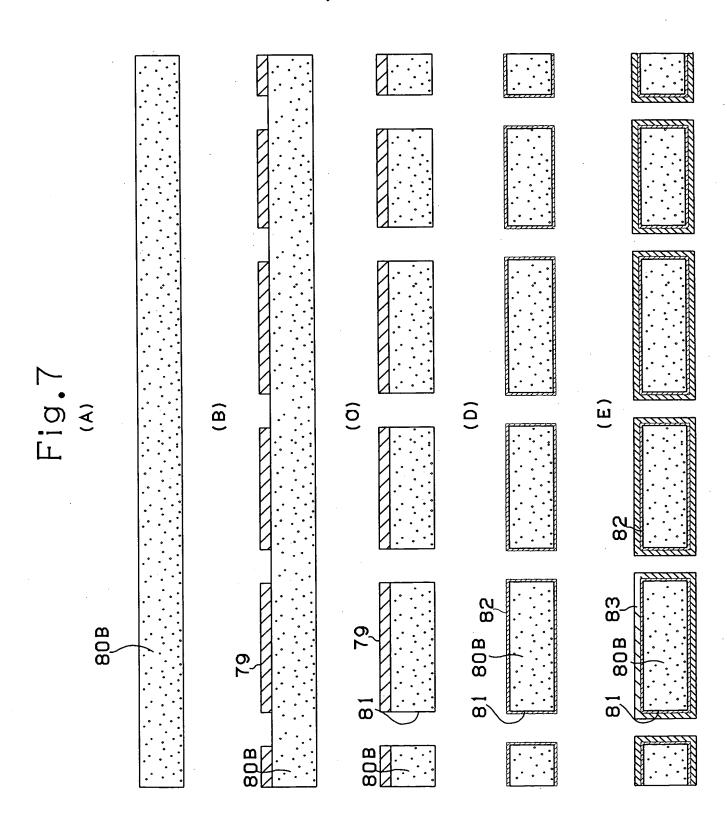


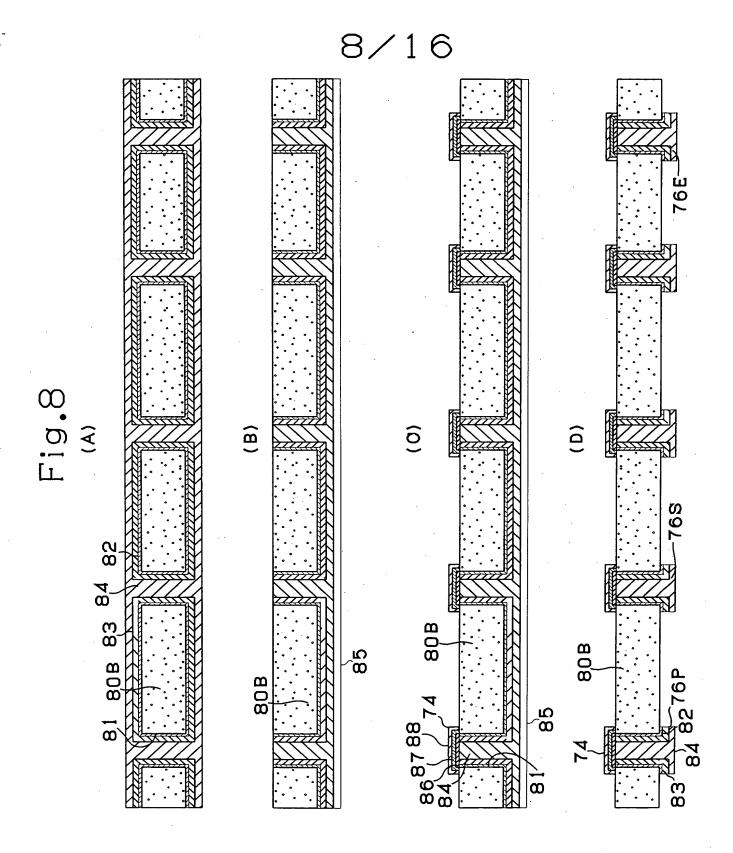




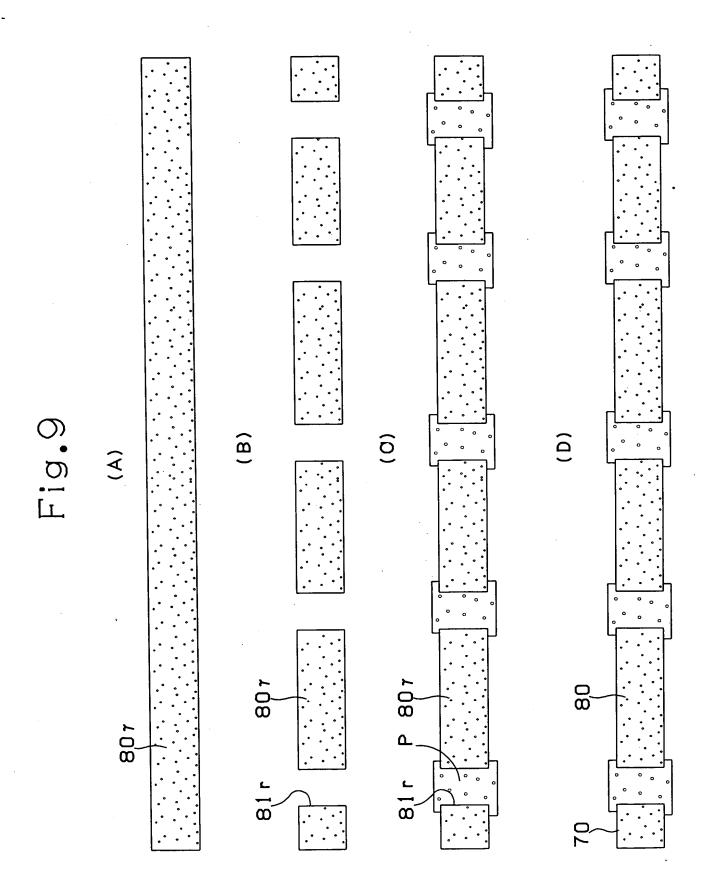


7/16

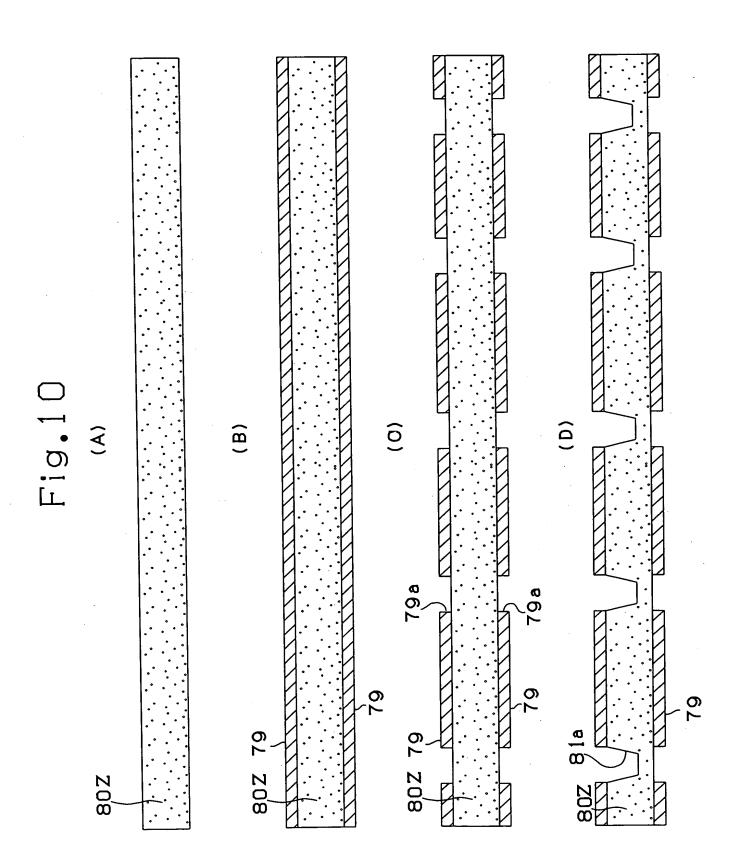




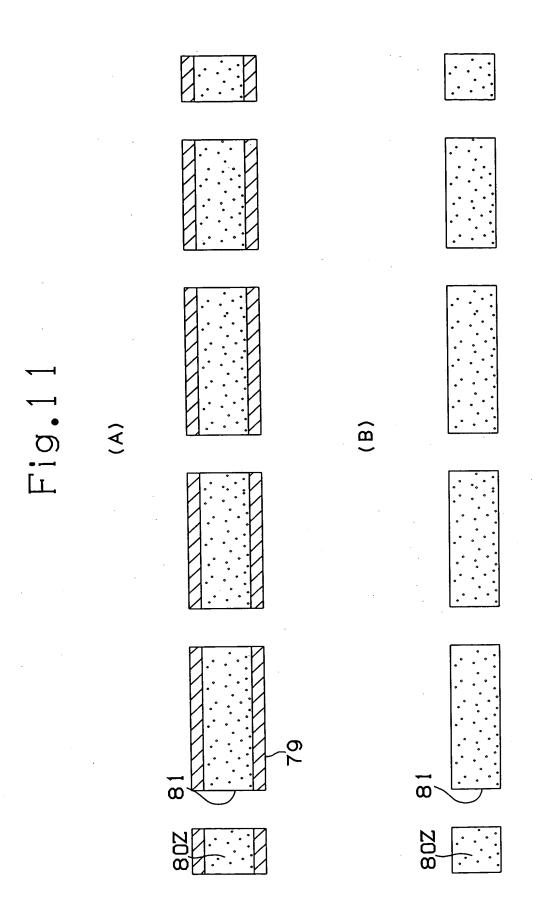
9/16



10/16



11/16



										r		—-т					- 1	1	Т	r	Т	 -						
ر st (%)		After	2000	cycles	×	×	×	×	×	×	×	×	0	0	0	×	×	×	0	0	0	×	0	×	×	×	×	×
conductior at cycle te		After	1500	cycles	×	×	×	×	×	×	×	0	0	0	0	0	×	0	0	0	0	0	0	×	×	×	×	0
Change amount of conduction resistance after heat cycle test (%)		After	001	cycles	×	۵	0	0	0	٥	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Change a resistano		After	200	cycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
in insulation		Diameter of	minimum	opening of through hole	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125
Diameter of through hole formed in insulation base material (µm)		Diameter of	opening in other	end face	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125
Diameter of throug base material (μm)		Diameter of	opening in	an end face	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125
Size of insulation	pase	material	× mm)	mm)	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	24	20	40	32	32	32
Thickness of insulation	base material	(µmt)			50	64	100	400	1000	1500	50	64	100	400	1000	1500	50	64	100	400	1000	1500	100	100	100	400	50	64
Young's modulus of	insulation	base	material	(Gpa)	55	55	55	55	55	55	200	200	200	200	200	200	440	440	440	440	440	440	200	200	200	310	310	310
•					Embodiment1	Embodiment2	Embodiment3	Embodiment4	Embodiment5	Embodiment6	Embodiment7	Embodiment8	Embodiment9	Embodiment10	Embodiment11	Embodiment12	Embodiment13	Embodiment14	Embodiment15	Embodiment16	Embodiment17	Embodiment18	Embodiment19	Embodiment20	Embodiment21	Embodiment22	Embodiment23	Embodiment24

C	3
٧	_
	ьio
i	工

	Vol.pg.'s	Thickness	Size of	Diameter of	Diameter of through hole formed in	rmed in	Change a	amount o	Change amount of conduction	tion
	modulus of	of	insulation	insulation ba	insulation base material (μm)		resistand	e after h	resistance after heat cycle test(%)	test(%)
	insulation	insulation	base							
	base	base	material	Diameter	Diameter of	Diameter of	After	After	After	After
	material	material	(mm x mm)	of opening	opening in	minimum	200	1000	1500	2000
	(Gna)	(umt)		in an end	other end	opening of	cycles	cycles	cycles	cycles
		Ì Ļ		face	face	through				
						hole				
Carte of imposed 75	310	100	32	125	125	125	0	0	0	0
Embodiment26	310	400	32	125	125	125	0	0	0	0
Embodiment 27	310	1000	32	125	125	125	0	0	0	0
Embodiment 28	310	1500	32	125	125	125	0	0	0	×
Embodiment 29	55	20	32	125	125	125	0	0	×	×
Embodiment30	55	64	32	125	125	125	0	0	0	×
Embodiment31	55	100	32	125	125	125	0	0	0	0
Embodiment32	55	400	32	125	125	125	0	0	0	©
Embodiment33	55	1000	32	125	125	125	0	0	0	0
Embodiment34	55	1500	32	125	125	125	0	0	0	×
Embodiment35	65.5	20	32	125	125	125	0	0	×	×
Embodiment36	65.5	64	32	125	125	125	0	0	0	×
Embodiment37	65.5	100	32	125	125	125	0	0	0	0
Embodiment38	65.5	400	32	125	125	125	0	0	0	0
Embodiment39	65.5	1000	32	125	125	125	0	0	0	0
Embodiment40	65.5	1500	32	125	125	125	0	0	0	×
Embodiment41	65.5	20	32	125	125	122.5	0	0	0	0
Embodiment42	65.5	20	32	125	125	25.0	0	0	0	0
Embodiment43	65.5	20	32	125	125	25.0	0	0	0	0
Experimental Example 1	200	100	32	125	125	125	0	×	×	×
Experimental Example 2	200	100	32	125	125	125	0	0	0	0
Experimental Example3	200	100	32	09	09	09	0	0	0	×
Experimental Example4	200	100	32	09	09	09	0	0	0	×

	Young's modulus	Thickness of	Size of insulation	Diameter of th insulation base	Diameter of through hole formed in insulation base material (μm)	u pa	Change amount of conduction resistance after heat cycle test (%)	ount of cor after heat	nduction cycle test	(%)
	insulation base material		(mm x mm)	Diameter of opening in an end face	Diameter of opening in other end	Diameter of minimum opening of	After 500 cycles	After 1000 cycles	After 1500 cycles	After 2000 cycles
	(Gpa)				face	through hole	-			
Comparative	20	100	32	125	125	125	×	×	×	×
Comparative	470	100	32	125	125	125	×	×	×	×
Example2										
Comparative	200	45	32	125	125	125	×	×	×	×
Example3										
Comparative	200	1600	32	125	125	125	×	×	×	×
Example4										
Comparative	55	20	15	125	125	125	IC cannot be mounted on the insulation	be mounte	d on the	nsulation
Example5							material.			
Comparative	55	20	45	125	125	125	Insulation material cannot be mounted	material c	annot be	mounted
Example6							on the package substrate.	kage subst	rate.	
Comparative	65.5	20	32	125	125	22.7	0	×	×	×
Example7										

○ : -3% ≤ resistance change rate v 3%

 $\odot:-6\%$ s resistance change rate < -3% and 3% < resistance change rate $\le 6\%$

X:-10% > resistance change rate and 10% < resistance change $\Delta~:$ -10% s resistance change rate < -6% and 6% < resistance change rate \le 10%

rate unacceptable if ±10% is exceeded

Thickness of package substrate: 1.0mm Resistance change rate (%) = I resistance value after heat cycle – initial value I/initial value x 100

External size of package substrate: 40mm x 40mm Thickness of core of package substrate: 0.8mm

External size of IC: 20mm x 20mm

